

Tetramolopium diersingii Shaw & Lowrey



Family: Asteraceae (Compositae, Sunflower Family)

Common Name: Tooth Leaf Pamakani

Federal Status: None

Description:

Life Span: perennial. **Habit:** erect shrub up to 2 m tall, single-stemmed at the base, branching above. **Vegetative:** stems round; leaves alternate, linear to oblanceolate, margins entire to variously and deeply toothed, pubescent (with long straight hairs to almost glabrous). **Floral:** numerous heads in open clusters at the tips of branches; bracts that subtend the flowers are up to 6 mm long and narrow; ray florets numerous, petals usually white and become recurved with age; disk florets yellow or (rarely) maroon; pappus white and nearly 4 mm long. **Fruit:** an achene with 1-2 nerves.

Distribution:

Historical: Hawaii. **Current:** Four populations are known from the installation.

Habitat:

Substrate: *Tetramolopium diersingii* is rare on 3,000-to 5,000-year old Mauna Loa pahoe-hoe lava flows. **Plant Communities:** Open *Metrosideros* Treeland with sparse shrub understory, *Dodonaea* Mixed Shrubland, and *Myoporum* Shrubland.

Estimated Number of Individuals on PTA: < 400

Threats: Extremely small numbers make this species vulnerable to catastrophic disturbance. Wildfire is probably the major threat to the species. Feral sheep and goats occasionally will consume seedlings of *T. diersingii*; however, the mature plants do not appear to be palatable to them.

Comments: This species is new to science. It is related to *T. arenarium*, *T. consanguineum*, and *T. lepidotum* and was reported as the latter species on a poster of rare plants of the installation. The plant can be readily propagated in the greenhouse.

Figure 71. *Tetramolopium diersingii*: (a) typical flowering branch; (b) simple leaf with unevenly toothed margin; (c) side view of single head from inflorescence; (d) top view of single head; (e) ray floret; (f) disk floret; and (g) achene with pappus and cross-section showing a single nerve per face.

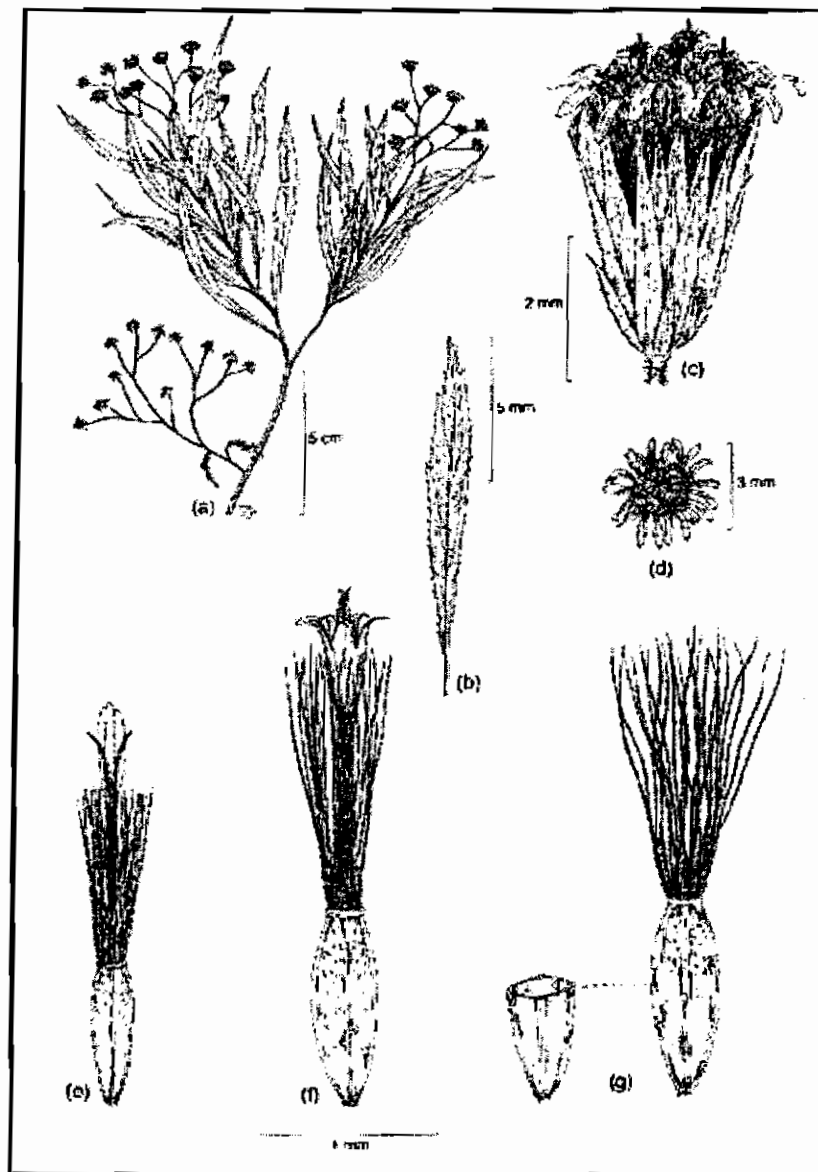
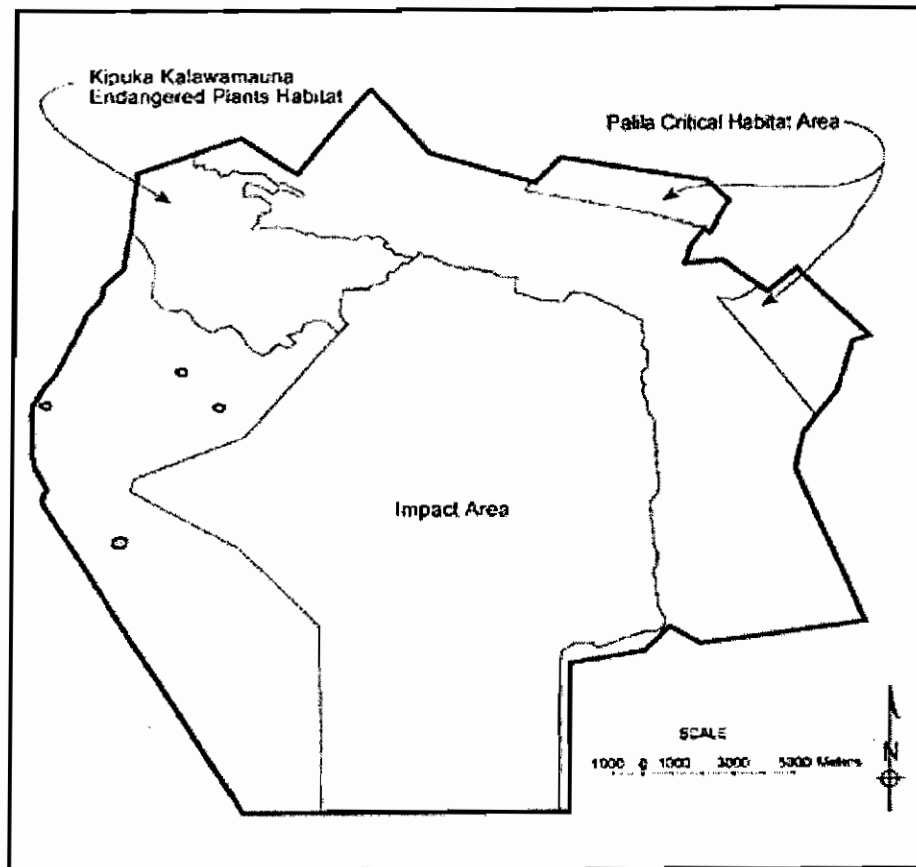


Figure 72. *Tetramolopium diersingii*: (a) immature plant with large, irregularly-toothed leaves; (b) inflorescence with numerous heads on long and flexuous peduncles; (c) typical *Dodonaea* Mixed Shrubland habitat within Kipuka Alala; and (d) typical *Myoporum* Shrubland habitat where the species occurs near Charlie Circle.
Below clockwise from upper left:



Figure 73. Distribution of *Tetramolopium diersingii* on Pohakuloa Training Area, Hawaii.



***Tetramolopium humile* (A. Gray) Hillebr.
ssp. *humile* var. *sublaeve* Sherff**



Family: Asteraceae (Compositae, Sunflower Family)

Common Name: Subalpine Pamakani

Federal Status: Species of Concern

Description:

Life Span: perennial. **Habit:** small shrub up to 20 cm tall; stems branching at the base. **Vegetative:** stems densely glandular and resinous; leaves alternate, linear to spatulate, margins entire. **Floral:** heads solitary or several in dense clusters at the tips of branches; ray florets numerous, petal white or rarely purple tinged; disk florets pink to purple, or (rarely) yellow; pappus yellowish-brown, up to 8 mm long. **Fruit:** an achene 0-1 nerved.

Distribution:

Historical: Maui and Hawaii **Current:** The typical variety of the species (*Tetramolopium humile* var. *humile*) is relatively common across PTA, but it is most abundant on the southeast side of the installation along Redleg Trail, Puu Koli, and on slopes of Mauna Loa. Variety *sublaeve* is rare and has only been reported from several isolated locations.

Habitat:

Substrate: *Tetramolopium humile* var. *sublaeve* is rare on variously aged Mauna Kea pahoehoe and aa lava flows. **Plant Communities:** Sparse *Metrosideros* Treeland and *Styphelia-Dodonaea* Shrubland.

Estimated Number of Individuals on PTA: < 100

Threats: The plant is known to occur on a live-fire range, so munitions might potentially impact some individuals. The species does not appear to be palatable to feral ungulates.

Comments: There is little notable difference between *T. h.* var. *sublaeve* and the very common *T. h.* var. *humile*. The former variety has minutely glandular leaves, while the latter species has densely glandular, hispid leaves. The varieties are sympatric, and the validity of maintaining the two varieties is in question.

Figure 74. *Tetramolopium humile* var. *sublaeve*: (a) general cespitose habit; (b) linear-oblong leaf with entire margins (insert showing glandular hairs along margin); (c) solitary head; (d) top view of head; (e) ray floret; (f) disk floret; and (g) achene with well developed pappus.

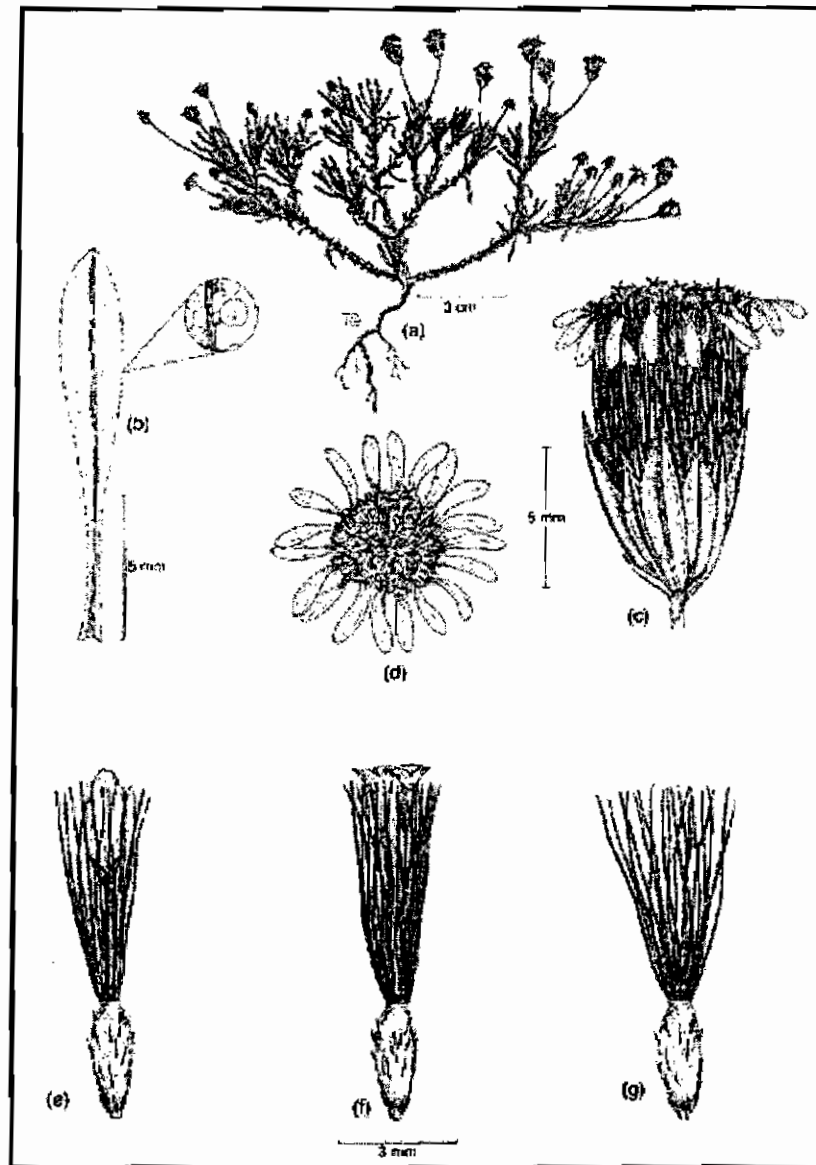


Figure 75. *Tetramolopium humile* var. *sublaeve*: (a) plant growing in young pahoehoe lava; (b) solitary heads showing white ray florets and yellow disk florets; (c) typical *Styphelia-Dodonaea* habitat near Puu Koli; and (d) typical Sparse *Metrosideros* Treeland habitat off Redleg Trail. Below clockwise from upper left:

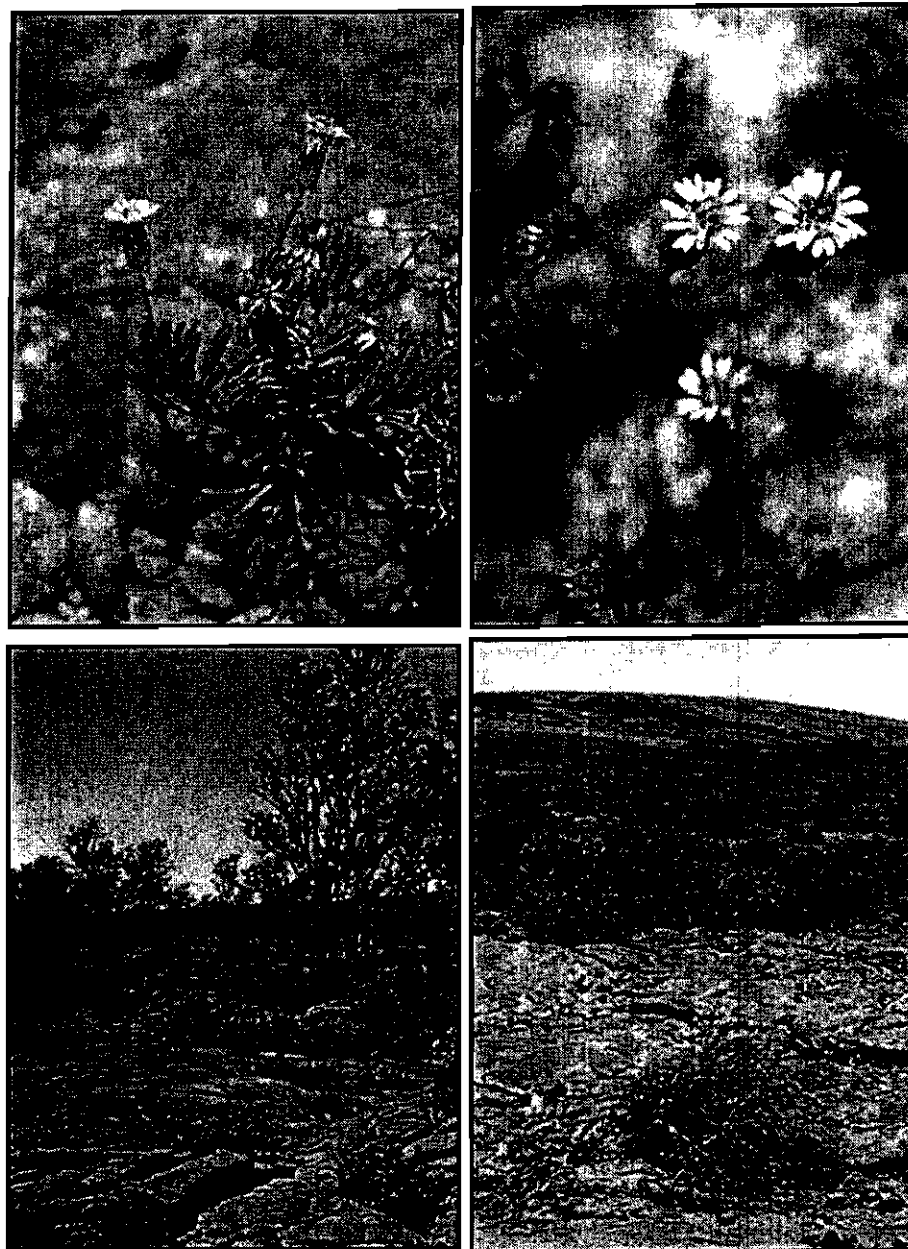
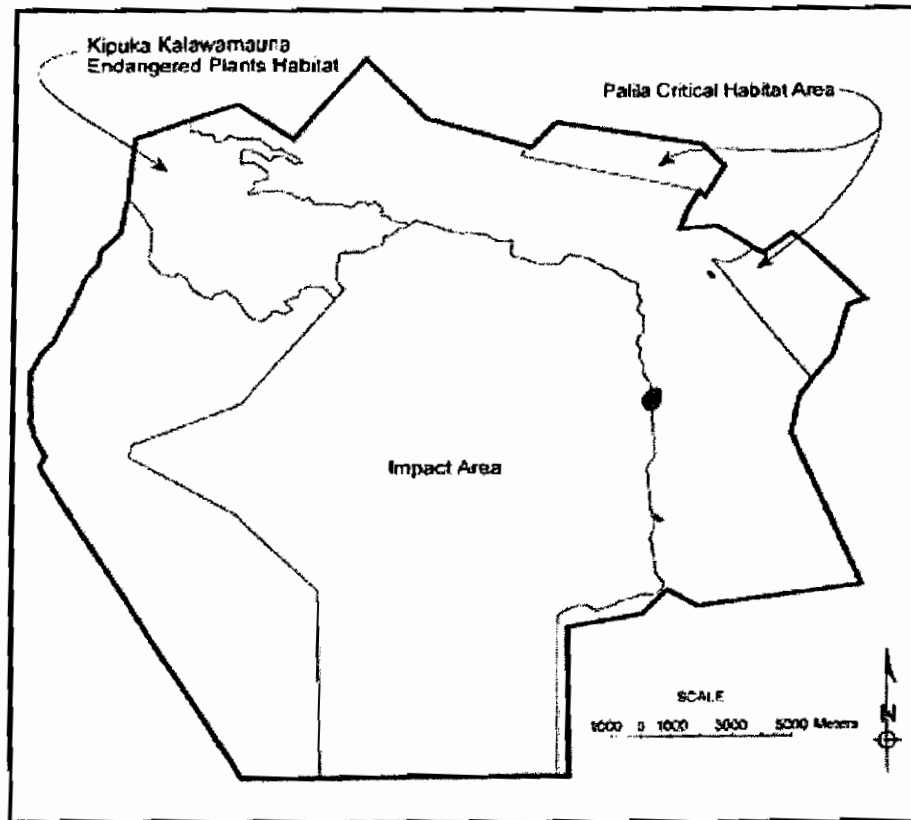


Figure 76. Distribution of *Tetramolopium humile* var. *sublaeve* on Pohakuloa Training Area, Hawaii.



***Zanthoxylum hawaiiense* Hillebr.**



Family: Rutaceae (Citrus Family)

Common Name: Hawaiian Yellow Wood, Ae

Federal Status: Endangered

Description:

Life Span: perennial. **Habit:** a small tree up to 8 m tall. **Vegetative:** stem up to 30 cm in diameter, covered with lenticels in distinct rows. Leaves alternate, composed of three leaflets; leaflets triangular to lance-shaped; foliage lemon-scented. **Floral:** flowers unisexual and on different trees or occasionally flowers perfect. **Fruit:** a follicle with a single black, hard, glossy seed.

Distribution:

Historical: Hawaii, Lanai, Maui, Molokai. **Current:** *Zanthoxylum hawaiiense* occurs on the west side of PTA from the southern boundary of the Kipuka Kalawamauna Endangered Plants Habitat to the northern boundary of Kipuka Alala. It also has been documented in dry montane forests between PTA and Puu Waa Waa.

Habitat:

Substrate: This species is found on Mauna Kea aa flows (> 10,000 years old) and on Mauna Loa aa and pahoehoe flows that vary from 900-5,000 years old. **Plant**

Communities: Sparse *Metrosideros* Treeland, Open *Metrosideros* Treeland with sparse shrub understory, Open *Metrosideros* Treeland with dense shrub understory, Intermediate *Metrosideros* Mixed Treeland, *Myoporum* Shrubland, and *Myoporum-Dodonaea* Shrubland.

Estimated Number of Individuals on PTA: > 125

Threats: Feral sheep and/or goats occasionally browse on this species. A few individuals occur alongside or near roads where dust could have a negative impact on them.

Comments: Individuals of this species are widely scattered and rarely will more than a few plants be found in close proximity to one another. Leaves and leaflets have long stalks and they resemble quaking aspen (*Populus tremuloides*) when blown by the wind.

Figure 77. *Zanthoxylum hawaiiense*: (a) branch showing leaves and inflorescence; (b) single trifoliate leaf (insert showing pubescence on leaf surface); (c) side and top view of perfect flower; (d) side and top view of staminate flower with reduced and nonfunctional pistils; (e) side and top view of pistillate flower with reduced and nonfunctional stamens; (f) single follicle with pitted exocarp; and (g) seed with rugose surface after drying.

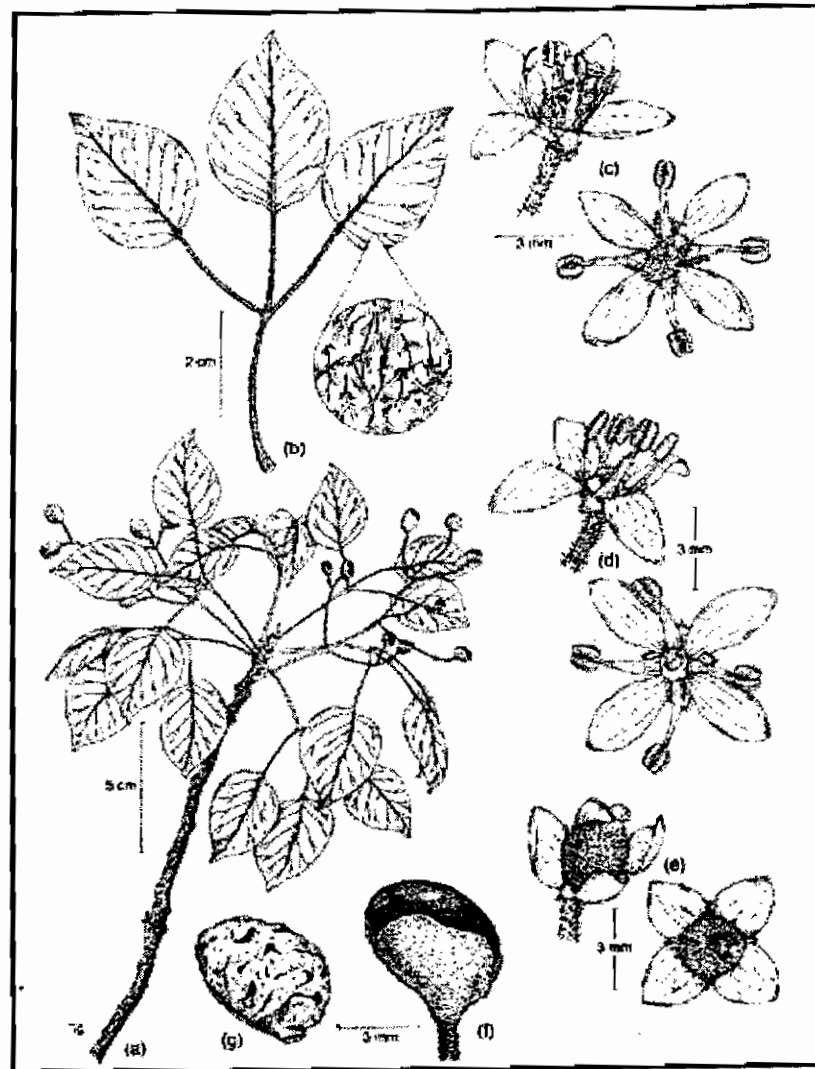


Figure 78. *Zanthoxylum hawaiiense*: (a) general habit; (b) tip of branch showing leaves and fruits; (c) trunk of tree showing bark lenticular bark; and (d) typical habitat in Intermediate *Metrosideros* Mixed Treeland on the southwest side of the installation.

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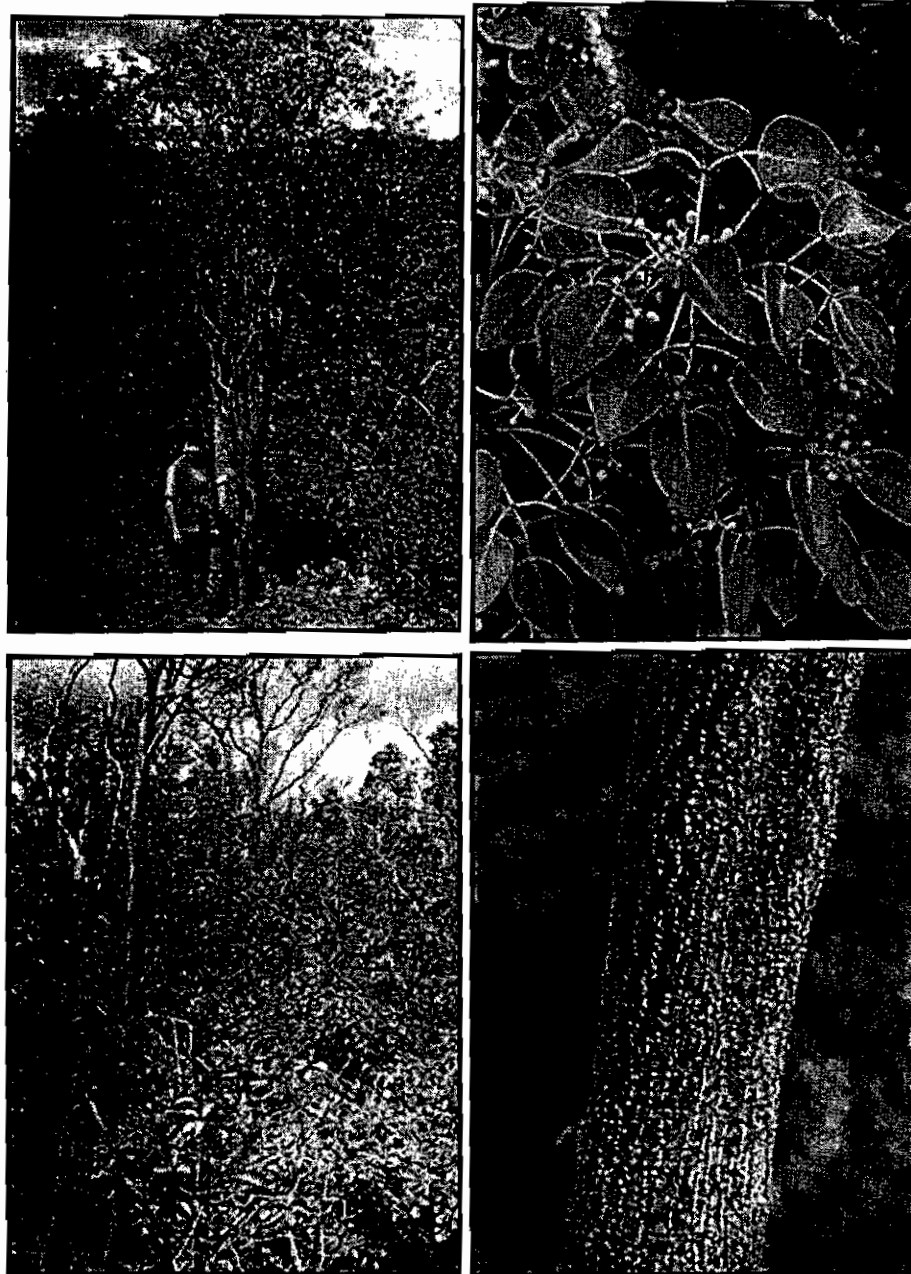
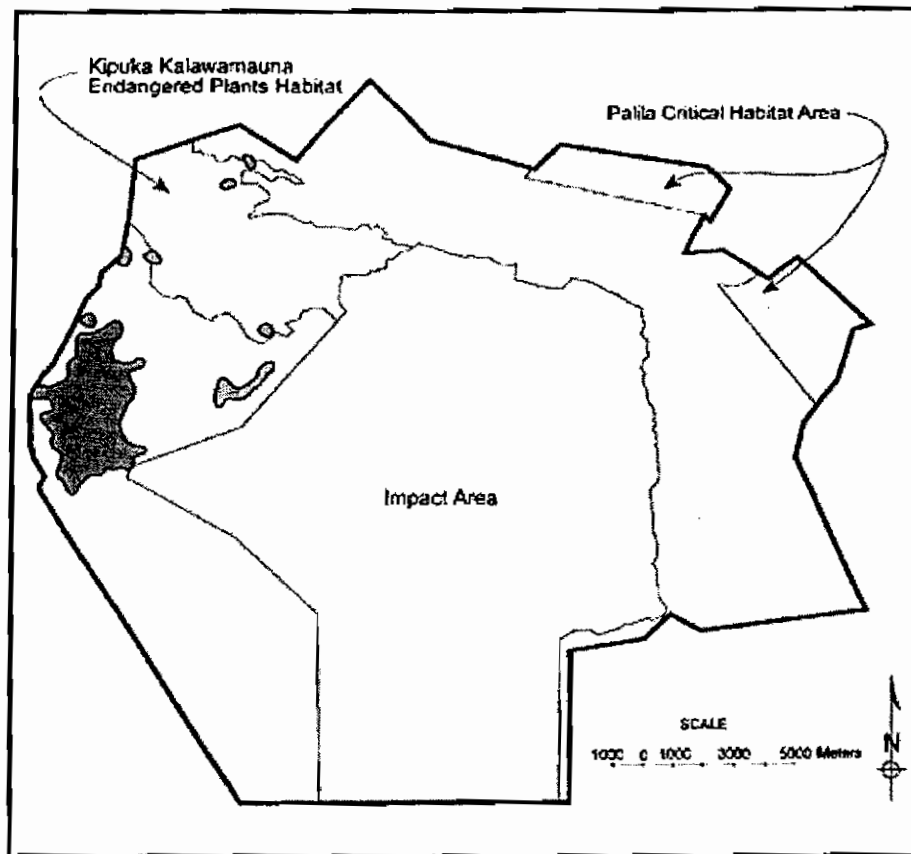


Figure 79. Distribution of *Zanthoxylum hawaiiense* on Pohakuloa Training Area, Hawaii.



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Species List

As stated previously, surveys of the botanical resources at PTA have been almost continuous since November 1988. The following is a list of vascular plant species that have been collected from PTA and verified. The list is maintained and updated by the Floristics Laboratory at the Center for Ecological Management of Military Lands (CEMML), Colorado State University. Nomenclature and other information concerning the Pteridophyta (ferns) was provided by Alan R. Smith (pers. comm.). Wagner et al. (1990) was the reference for nomenclature concerning the Anthophyta (flowering plants).

The list is arranged alphabetically by family, genus, species, subspecies, and variety within each major plant category (Pteridophyta, Coniferophyta, Anthophyta, Liliopsida [monocot] and Magnoliopsida [dicot]).

The scientific name and following information is given for each taxa:

L = Life span or longevity: annual (A), perennial (P).

A = Affinity: endemic (E)-species that occur naturally only in the Hawaiian Archipelago; indigenous (I)-species that occur naturally within the Archipelago but which have a wider distribution; naturalized (N)-species introduced by humans; uncertain (?) -species with uncertain origin.

H= Habit: fern and fern allies (F), grass (G), herb (H), parasite (P), shrub (S), tree (T), and vine (V).

S = Status under the Endangered Species Act: endangered (E), threatened (T), species of concern (S), or none(-) (U.S. Fish and Wildlife Service 1997).

Scientific name	L	A	H	S
PTERIDOPHYTA				
ASPLENIACEAE				
<i>Asplenium adiantum-nigrum</i> L	P	I	F	-
<i>Asplenium fragile</i> K. Presl var. <i>insulare</i> C. Morton (SYN= <i>A. rhomboideum</i> Brack.)	P	E	F	E
<i>Asplenium praemorsum</i> Sw. (SYN= <i>A. rhipidoneuron</i> B. L. Robins.)	P	I	F	-
<i>Asplenium trichomanes</i> L.	P	I	F	-
<i>Cheilanthes decora</i> (Brack.) R. M. & A. F. Tryon (SYN= <i>Dryopteris decors</i> Brack.)	P	E	F	-
BLECHNACEAE				
<i>Sadleria cyatheoides</i> Kaulf.	P	E	F	-
DENNSTAEDTIACEAE				
<i>Lindsaea repens</i> (Bory) Thwaites var. <i>macaracana</i> (Hook. & Arnott) Mett. ex Kuhn	P	E	F	-
<i>Pteridium aquilinum</i> (L.) Kuhn var. <i>decompositum</i> (Gaud.) R. Tryon	P	E	F	-
DRYOPTERIDACEAE				
<i>Cyrtomium falcatum</i> (L. f.) K. Presl	P	N	F	-
<i>Cystopteris douglasii</i> Hook.	P	E	F	-
<i>Dryopteris wallichiana</i> (Spreng.) Hyl.	P	I	F	-
<i>Nephrolepis exaltata</i> (L.) Schott ssp. <i>hawaiiensis</i> W. H. Wagner, ined.	P	E	F	-
POLYPODIACEAE				
<i>Lepisorus thunbergianus</i> (Kaulf.) Ching (SYN= <i>Pleopeltis thunbergiana</i> Kaulf.)	P	I	F	-
<i>Polypodium pellucidum</i> Kaulf. var. <i>vulcanicum</i> Skottsb.	P	E	F	-
PSILOTACEAE				
<i>Psilotum nudum</i> (L.) P. Beauv	P	I	F	-

PTERIDACEAE

<i>Adiantum raddianum</i> K. Presl	P	N	F	-
<i>Pellaea ternifolia</i> (Cav.) Link	P	I	F	-
<i>Pteris cretica</i> L.	P	N	F	-

THELYPTERIDACEAE

<i>Christella parasitica</i> (L.) H. Lév.	P	N	F	-
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CONIFEROPHYTA**PINACEAE**

<i>Pinus coulteri</i> D. Don	P	N	T	-
<i>Pinus radiata</i> D. Don	P	N	T	-

ANTHOPHYTA**LILIOPSIDA****AGAVACEAE**

<i>Cordyline fruticosa</i> (L.) A. Chev.	P	N	S	-
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CYPERACEAE

<i>Bulbostylis capillaris</i> (L.) C. B. Clarke	A	N	H	-
<i>Carex inverse</i> R. Br.	P	N	H	-
<i>Carex wahuensis</i> C. A. Mey. ssp. <i>rubiginosa</i> (R. Krauss) T. Koyama	P	E	H	-
<i>Carex wahuensis</i> C. A. Mey. ssp. <i>wahuensis</i>	P	E	H	-
<i>Gahnia gahniiformis</i> (Gaud.) A. Heller	P	I	H	-
<i>Mariscus hillebrandii</i> (Boeck.) T. Koyama ssp. <i>hillebrandii</i>	P	E	H	-

JUNCACEAE

<i>Luzula hawaiiensis</i> Buchenau var. <i>hawaiiensis</i>	P	E	H	-
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LILIACEAE

<i>Dianella sandwicensis</i> Hook. & Arnott	P	I	H	-
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POACEAE

<i>Agrostis avenacea</i> J. G. Gmelin	P	I	G	-
<i>Agrostis sandwicensis</i> Hillebr.	P	E	G	-

<i>Anthoxanthum odoratum</i> L.	P	N	G	-
<i>Avena fatua</i> L.	A	N	G	-
<i>Briza minor</i> L.	A	N	G	-
<i>Bromus rigidus</i> Roth (SYN= <i>Bromus diandrus</i> Roth)	A	N	G	-
<i>Bromus willdenowii</i> Kunth (SYN= <i>Bromus catharticus</i> Vahl)	A/P	N	G	-
<i>Chloris gayana</i> Kunth	A	N	G	-
<i>Cynodon dactylon</i> (L.) Pers.	P	N	G	-
<i>Dactylis glomerata</i> L.	P	N	G	-
<i>Danthonia pilosa</i> R. Br	P	E	G	-
<i>Deschampsia nubigena</i> Hillebr.	P	E	G	-
<i>Ehrharta calycina</i> Smith	P	N	G	-
<i>Ehrharta stipoides</i> Labill. [SYN= <i>Microlaena stipoides</i> (Labill.) R. Br.]	P	N	G	-
<i>Eragrostis atropioides</i> Hillebr.	P	E	G	-
<i>Eragrostis brownei</i> (Kunth) Nees ex Steud.	P	N	G	-
<i>Eragrostis deflexa</i> Hitchc.	P	E	G	S
<i>Eragrostis leptophylla</i> Hitchc.	P	E	G	-
<i>Festuca hawaiiensis</i> Hitchc.	P	E	G	S
<i>Gastridium ventricosum</i> (Gouan) Schinz & Thell.	P	E	G	S
<i>Holcus lanatus</i> L.	P	N	G	-
<i>Hordeum leporinum</i> Link [SYN= <i>Hordeum murinum</i> L. ssp. <i>leporinum</i> (Link) Arcang.]	A	N	G	-
<i>Koeleria nitida</i> Nutt. [SYN= <i>Koeleria macrantha</i> (Ledeb.) Schultes]	P	N	G	-
<i>Lolium perenne</i> L.	P	N	G	-
<i>Melinis minutiflora</i> P. Beauv.	P	N	G	-
<i>Panicum konaense</i> Whitney & Hosaka	A	E	G	-
<i>Panicum pellitum</i> Trin.	A	E	G	-
<i>Panicum tenuifolium</i> Hook. & Arnott	P	N	G	-
<i>Paspalum dilatatum</i> Poir.	P	N	G	-
<i>Paspalum notatum</i> Flugge	P	N	G	-

<i>Pennisetum clandestinum</i> Chiov.	P	N	G	-
<i>Pennisetum setaceum</i> (Forssk.) Chiov.	P	N	G	-
<i>Poa annua</i> L.	A	N	G	-
<i>Poa pratensis</i> L.	P	N	G	-
<i>Polypogon interruptus</i> Kunth	P	N	G	-
<i>Polypogon monspeliensis</i> (L.) Desf.	A	N	G	-
<i>Rhynchelytrum repens</i> (Willd.) Hubb.	A/P	N	G	-
<i>Sporobolus africanus</i> (Poir.) Robyns & Tourney	P	N	G	-
<i>Sporobolus indicus</i> (L.) R. Br.	P	N	G	-
<i>Stipa cernua</i> Stebb. & A. Love [SYN= <i>Nassella cernua</i> (Stebb. & A. Love) Barkworth]	P	N	G	-
<i>Trisetum glomeratum</i> (Kunth) Trin.	P	E	G	-
<i>Vulpia bromoides</i> (L.) S. F. Gray	A	N	G	-
<i>Vulpia myuros</i> (L.) C. C. Gmelin	A	N	G	-
SMILACACEAE				
<i>Smilax melastomifolia</i> Sm.	P	E	V	-
MAGNOLIOPSIDA				
AIZOACEAE				
<i>Lampranthus glomerata</i> (L.) N. E. Br.	P	N	V	-
AMARANTHACEAE				
<i>Nototrichium sandwicense</i> (A. Gray) Hillebr.	P	E	S/T	-
APIACEAE				
<i>Ciclospermum leptophyllum</i> (Pers.) Sprague	A	N	H	-
<i>Daucus pusillus</i> Michx.	A	N	H	-
<i>Foeniculum vulgare</i> Mill.	P	N	H	-
<i>Petroselinum crispum</i> (Mill.) A. W. Hill	P	N	H	-
<i>Spermolepis hawaiiensis</i> Wolff	A	E	H	E
APOCYNACEAE				
<i>Alyxia oliviformis</i> Gaud	P	E	S/V	-

ASCLEPIADACEAE

<i>Asclepias curassavica</i> L.	P	N	H	-
<i>Asclepias physocarpa</i> (E. Mey.) Schlecter	P	N	H	-

ASTERACEAE

<i>Achillea millefolium</i> L.	P	N	H	-
<i>Ageratina riparia</i> (Regel) R. King & H. Robinson	P	N	S	-
<i>Ageratum conyzoides</i> L.	A/P	N	H	-
<i>Ambrosia pumila</i> (Nutt.) A. Gray	P	N	H	-
<i>Anthemis cotula</i> L.	A	N	H	-
<i>Bidens alba</i> (L.) DC var. <i>radiata</i> (Schultz-Bip.) Ballard ex Melchert	A/P	N	H	-
<i>Bidens menziesii</i> (A. Gray) Sherff ssp. <i>filiformis</i> (Sherff) Ganders & Nagata	P	E	S	-
<i>Bidens pilosa</i> L.	A	N	H	-
<i>Centaurea melitensis</i> L.	A	N	H	-
<i>Cirsium vulgare</i> (Savi) Ten.	P	N	H	-
<i>Conyza bonariensis</i> (L.) Cronq.	A	N	H	-
<i>Conyza canadensis</i> (L.) Cronq. var. <i>canadensis</i>	A	N	H	-
<i>Conyza canadensis</i> (L.) Cronq. var. <i>pusilla</i> (Nutt.) Cronq.	A	N	H	-
<i>Crassocephalum crepidoides</i> (Benth.) S. Moore	A	N	H	-
<i>Crepis capillaris</i> (L.) Wallr.	A/P	N	H	-
<i>Dubautia ciliolata</i> (DC) D. Keck ssp. <i>ciliolata</i>	P	E	S	-
<i>Dubautia linearis</i> (Gaud.) D. Keck ssp. <i>hillebrandii</i> (H. Mann) G. Carr	P	E	S	-
<i>Dubautia scabra</i> (DC) D. Keck	P	E	S	-
<i>Emilia fosbergii</i> Nicolson	A	N	H	-
<i>Galinsoga parviflora</i> Cav.	A	N	H	-
<i>Galinsoga quadriradiata</i> Ruiz & Pav.	A	N	H	-
<i>Gnaphalium japonicum</i> Thunb.	A	N	H	-
<i>Gnaphalium purpureum</i> L. [SYN= <i>Gamochaeta purpurea</i> (L.) Cabrera]	A/P	N	H	-
<i>Gnaphalium sandwicense</i> Gaud. var. <i>hawaiiense</i> (Degener & Sherff) W. L. Wagner, Herbst & Sohmer	P	E	H	-

<i>Gnaphalium sandwicense</i> Gaud. var. <i>kilaueanum</i> Degener & Sherff	P	E	H	-
<i>Gnaphalium sandwicense</i> Gaud. var. <i>sandwicense</i>	P	E	H	-
<i>Helichrysum foetidum</i> (L.) Cass.	P	N	H	-
<i>Heterotheca grandiflora</i> Nutt.	A/P	N	H	-
<i>Hypochoeris radicata</i> L.	P	N	H	-
<i>Lactuca serriola</i> L.	P	N	H	-
<i>Lipochaeta subcordata</i> A. Gray	P	E	H	-
<i>Picris hieracioides</i> L.	P	N	H	-
<i>Pluchea symphytifolia</i> (Mill.) Gillis	P	N	S	-
<i>Reichardia tingitana</i> (L.) Roth	A/P	N	H	-
<i>Senecio mikanioides</i> Otto ex Walp.	P	N	V	-
<i>Senecio sylvaticus</i> L.	A	N	H	-
<i>Senecio vulgaris</i> L.	A	N	H	-
<i>Sigesbeckia orientalis</i> L.	A	N	H	-
<i>Sonchus asper</i> (L.) J. Hill	A	N	H	-
<i>Sonchus oleraceus</i> L.	A	N	H	-
<i>Tagetes minuta</i> L.	A	N	H	-
<i>Tetramolopium arenarium</i> (A. Gray) Hillebr.	P	E	S	E
<i>Tetramolopium consanguineum</i> (A. Gray) Hillebr. ssp. <i>leptophyllum</i> (Sherff) Lowrey var. <i>leptophyllum</i>	P	E	S	S
<i>Tetramolopium diersingii</i> Shaw & Lowrey ¹	P	E	S	-
<i>Tetramolopium humile</i> (A. Gray) Hillebr. ssp. <i>humile</i> var. <i>humile</i>	P	E	S	-
<i>Tetramolopium humile</i> (A. Gray) Hillebr. ssp. <i>humile</i> var. <i>sublaeve</i> Sherff	P	E	S	S
<i>Verbesina encelioides</i> (Cav.) Benth. & Hook	A	N	H	-
<i>Xanthium strumarium</i> L. var. <i>candense</i> (Mill.) Torr. & A. Gray	A	N	H	-
<i>Youngia japonica</i> (L.) DC	A	N	H	-
<i>Zinnia peruviana</i> (L.) L.	A	N	H	-

BRASSICACEAE

<i>Brassica juncea</i> (L.) Czernj.	A	N	H	-
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<i>Brassica nigra</i> (L.) W. Koch	A	N	H	-
<i>Capsella rubella</i> Reut.	A	N	H	-
<i>Cardamine flexuosa</i> With.	A/P	N	H	-
<i>Coronopus didymus</i> (L.) Sm.	A	N	H	-
<i>Lepidium africanum</i> (Burm. f.) DC	P	N	H	-
<i>Lepidium hyssopifolium</i> Desv.	P	N	H	-
<i>Lepidium virginicum</i> L.	A/P	N	H	-
<i>Sisymbrium altissimum</i> L.	A	N	H	-
<i>Sisymbrium irio</i> L.	A	N	H	-
<i>Sisymbrium officinale</i> (L.) Scop.	A	N	H	-

CACTACEA

<i>Opuntia ficus-indica</i> (L.) Mill	P	N	T	-
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CAMPANULACEAE

<i>Triodanis biflora</i> (Ruiz & Pav.) Greene [SYN= <i>Triodanis perfoliata</i> (C.) Nieuwl. var. <i>biflora</i> (Ruiz & Pav.) Bradley]	A	N	H	-
<i>Wahlenbergia gracilis</i> (G. Forster) A. DC [SYN= <i>Wahlenbergia marginata</i> (Thunb.) A. DC]	P	N	H	-

CAPRIFOLIACEAE

<i>Sambucus mexicana</i> K. Presl. ex A. DC	P	N	S/T	-
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CARYOPHYLLACEAE

<i>Arenaria serpyllifolia</i> L.	A	N	H	-
<i>Cerastium fontanum</i> Baumg. ssp. <i>Triviale</i> (Link) J alas [SYN= <i>Cerastium fontanum</i> Baumg. ssp. <i>vulgare</i> (Hartman) Greuter & Burdet]	P	N	H	-
<i>Petrorhagia velutina</i> (Guss.) P. Ball & Heyw. [SYN= <i>Petrorhagia dubia</i> (Raf.) G. Lopez & Romo]	A	N	H	-
<i>Polycarpon tetraphyllum</i> (L.) L.	A	N	H	-
<i>Schiedea pubescens</i> Hillbr.	P	E	V	S
<i>Silene gallica</i> L.	A/P	N	H	-
<i>Silene hawaiiensis</i> Sherff	P	E	S	T

<i>Silene lanceolata</i> A. Gray	P	E	S	E
<i>Stellaria media</i> (L.) Vill.	A/P	N	H	-
CHENOPODIACEAE				
<i>Atriplex semibaccata</i> R. Br.	P	N	H	-
<i>Atriplex suberecta</i> Verd.	A	N	H	-
<i>Chenopodium album</i> L.	A	N	H	-
<i>Chenopodium ambrosioides</i> L.	A/P	N	H	-
<i>Chenopodium carinatum</i> R. Br.	A	N	H	-
<i>Chenopodium murale</i> L.	A	N	H	-
<i>Chenopodium oahuense</i> (Meyen) Aellen	P	E	S	-
<i>Salsola kali</i> L.	A	N	H	-
CONVOLVULACEAE				
<i>Ipomoea tuboides</i> Degener & Ooststr.	P	E	V	-
<i>Ipomoea violacea</i> L.	P	N	V	-
CRASSULACEAE				
<i>Crassula sieberiana</i> (Schult.) Druce	A	N	H	-
<i>Kalanchoe tubiflora</i> (Harv.) Raym.- Hamet	P	N	H	-
CUCURBITACEAE				
<i>Sicyos anunu</i> (St. John) Telford	A	E	V	-
<i>Sicyos lasiocephalus</i> Skottsb.	A	E	V	-
EPACRIDACEAE				
<i>Styphelia tameiameia</i> (Cham. & Schlechtend.) F. v. Muell	P	I	S	-
ERICACEAE				
<i>Vaccinium reticulatum</i> Sm.	P	E	S	-
EUPHORBIACEAE				
<i>Chamaesyce albomarginata</i> (Torr. & A. Gray) Small	P	N	H	-
<i>Chamaesyce multiformis</i> (Hook. & Arnott) Croizat & Degener var. <i>microphylla</i> (Boiss.) Degener & I. Degener	P	E	S	-
<i>Chamaesyce olowaluana</i> (Sherff) Croizat & Degener	P	E	T	S

<i>Euphorbia peplus</i> L.	A	N	H	-
<i>Ricinus communes</i> L.	P	N	S	-
FABACEAE				
<i>Indigofera suffruticosa</i> Mill.	P	N	S	-
<i>Lupinus arboreus</i> Sims.	P	N	S	-
<i>Medicago lupulina</i> L.	A/P	N	H	-
<i>Medicago polymorpha</i> L.	A	N	H	-
<i>Melilotus indica</i> (L.) All.	A	N	H	-
<i>Sophora chrysophylla</i> (Salisb.) Seem.	P	E	S/T	-
<i>Trifolium arvense</i> L. var. <i>arvense</i>	A	N	H	-
<i>Trifolium hybridum</i> L. var. <i>hybridum</i>	P	N	H	-
<i>Trifolium pratense</i> L. var. <i>sativum</i> Schreb.	P	N	H	-
<i>Trifolium repens</i> L. var. <i>repens</i>	P	N	H	-
<i>Vicia sativa</i> L. ssp. <i>nigra</i> (L.) Ehrh.	A	N	H	-
<i>Vicia villosa</i> Roth	A/P	N	H	-
FAGACEAE				
<i>Quercus suber</i> L.	P	N	T	-
GENTIANACEAE				
<i>Centaurium erythraea</i> Raf. ssp. <i>erythraea</i>	P	N	H	-
GERANIACEAE				
<i>Erodium cicutarium</i> (L.) L'Her.	A	N	H	-
<i>Geranium cuneatum</i> Hook. ssp. <i>hololeucum</i> (A. Gray) Carlq. & Bissing	P	E	S	-
<i>Geranium homeanum</i> Turcz.	P	N	H	-
<i>Geranium retrorsum</i> L'Hér. ex DC	P	N	H	-
LAMIACEAE				
<i>Haplostachys haplostachya</i> (A. Gray) St. John	P	E	H	E
<i>Marrubium vulgare</i> L.	P	N	H	-
<i>Plectranthus parviflorus</i> Willid.	P	I	H	-

<i>Stenogyne angustifolia</i> A. Gray	P	E	V	E
<i>Stenogyne microphylla</i> Benth.	P	E	V	-
<i>Stenogyne rugosa</i> Benth.	P	E	V	-
LYTHRACEAE				
<i>Lythrum maritimum</i> Kunth	P	I?	S	-
MALVACEAE				
<i>Malva parviflora</i> L.	A/P	N	H	-
<i>Sida fallax</i> Walp.	P	I	S	-
MENISPERMACEAE				
<i>Cocculus trilobus</i> (Thunb.) DC	P	I	V	-
MYOPORACEAE				
<i>Myoporum sandwicense</i> A. Gray	P	I	S/T	-
MYRSINACEAE				
<i>Myrsine lanaiensis</i> Hillebr.	P	E	T	-
MYRTACEAE				
<i>Eucalyptus citriodora</i> Hook.	P	N	T	-
<i>Metrosideros polymorpha</i> Gaud.var. <i>glaberrima</i> (H. Lév.) St. John	P	E	S/T	-
<i>Metrosideros polymorpha</i> Gaud. var. <i>polymorpha</i>	P	E	S/T	-
OLEACEAE				
<i>Ligustrum lucidum</i> Ait.	P	N	S/T	-
<i>Olea europaea</i> L. ssp. <i>europaea</i>	P	N	T	-
ONAGRACEAE				
<i>Epilobium billardierianum</i> Ser. ssp. <i>cinereum</i> (A. Rich.) Raven & Engelhorn	P	N	H	-
<i>Oenothera stricta</i> Ledeb. ex Link ssp. <i>stricta</i>	A/P	N	H	-
OXALIDACEAE				
<i>Oxalis corniculata</i> L.	P	N	H	-
PAPAVERACEAE				
<i>Argemone glauca</i> (Nutt. ex Prain) Pope	P	E	H	-

var. *decipiens* Ownbey

PASSIFLORACEAE

Passiflora mollissima (Kunth) L. H. Bailey P N V -

PIPERACEAE

Peperomia tetraphylla (G. Forster) Hook. & Arnott P I H -

PITTOSPORACEAE

Pittosporum confertiflorum A. Gray P E S/T -

Pittosporum terminalioides Planch. ex A. Gray P E T -

PLANTAGINACEAE

Plantago lanceolata L. P N H -

POLYGONACEAE

Emex spinosa (L.) Campd. A N H -

Polygonum capitatum E Ham. P N H -

Rumex acetosella L. P N H -

Rumex brownei Campd. P N H -

Rumex giganteus W. T. Aiton P E S/V -

Rumex skottsbergii Degener & I. Degener P E S -

PORTULACACEAE

Portulaca oleracea L. A N H -

Portulaca sclerocarpa A. Gray P E H E

Portulaca villosa Cham. P E H -

PRIMULACEAE

Anagallis arvensis L. A/P N H -

PROTEACEAE

Grevillea robusta A. Cunn. ex R. Br. P N T -

RHAMNACEAE

Alphitonia ponderosa Hillebr² P E T -

Rhamnus californica Eschsch var. *californica* P N S -

ROSACEAE

<i>Heteromeles arbutifolia</i> Roem.	P	N	S	-
<i>Osteomeles anthyllidifolia</i> (Sm.) Lindl.	P	I	S	-
<i>Rubus rosifolius</i> Sm.	P	N	S	-

RUBIACEAE

<i>Coprosma ernodeoides</i> A. Gray	P	E	S	-
<i>Coprosma montana</i> Hillebr.	P	E	S/T	-
<i>Hedyotis coriacea</i> Sm.	P	E	S	E

RUTACEAE

<i>Melicope hawaiiensis</i> (Wawra) T. G. Hartley & B. C. Stone (SYN= <i>Pelea hawaiiensis</i> Wawra)	P	E	S/T	S
<i>Zanthoxylum hawaiiense</i> Hillebr.	P	E	T	E

SANTALACEAE

<i>Exocarpos gaudichaudii</i> A. DC	P	E	S/T	S
<i>Exocarpos menziesii</i> Stauffer	P	E	S	-
<i>Santalum ellipticum</i> Gaud.	P	E	S/T	-
<i>Santalum paniculatum</i> Hook. & Arnott var. <i>paniculatum</i>	P	E	S/T	-
<i>Santalum paniculatum</i> Hook. & Arnott var. <i>pilgeri</i> (Rock) Stemmermann	P	E	S/T	-

SAPINDACEAE

<i>Dodonaea viscosa</i> Jacq.	P	I	S/T	-
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SCROPHULARIACEAE

<i>Lophospermum erubescens</i> D. Don	P	N	V	-
<i>Verbascum thapsus</i> L.	P	N	H	-
<i>Verbascum virgatum</i> Stokes	P	N	H	-
<i>Veronica plebeia</i> R. Br.	A/P	N	H	-
<i>Veronica serpyllifolia</i> L.	P	N	H	-

SOLANACEAE

<i>Datura stramonium</i> L.	A	N	H	-
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<i>Nicotiana tabacum</i> L.	P	N	H	-
<i>Physalis peruviana</i> L.	P	N	S	-
<i>Solanum americanum</i> Mill.	A/P	I?	H/S	-
<i>Solanum incompletum</i> Dunal	P	E	S	E
<i>Solanum nigrescens</i> Mart. & Galeotti	P	N	H/S	-
<i>Solanum pseudocapsicum</i> L.	P	N	S	-
THYMELAEACEAE				
<i>Wikstroemia phillyreifolia</i> A. Gray	P	E	S/T	-
URTICACEAE				
<i>Hesperocnide sandwicensis</i> (Wedd.) Wedd.	A	E	H	-
<i>Neraudia ovata</i> Gaud.	P	E	S	E
<i>Urtica urens</i> L.	A	N	H	-
VERBENACEAE				
<i>Verbena litoralis</i> Kunth	P	N	H	-
VISCACEAE				
<i>Korthalsella complanata</i> (Tiegh.) Engl.	P	I	P	-
<i>Korthalsella latissima</i> (Tiegh.) Danser	P	E	P	-
ZYGOPHYLLACEAE				
<i>Tribulus terrestris</i> L.	A	N	H	-

¹ Unpublished

² Personal communication, Joel Lau 1996.

LITERATURE CITED

- Brueggemann, M. M. 1995. Endangered and threatened wildlife and plants; proposed endangered status for thirteen plants from the Island of Hawaii, State of Hawaii. Fed. Reg. 60: 49377-49392.
- Brueggemann, M. M., J. E. Canfield and D. R. Herbst. 1994. Endangered and threatened wildlife and plants; endangered status for four ferns from the Hawaiian Islands. Fed. Reg. 59: 49025-49032.
- Canfield, J. E., D. R. Herbst and A. Asquith. 1994. Endangered and threatened wildlife and plants; endangered status for 12 plants from the Hawaiian Islands. Fed. Reg. 59:56333-56351.
- Castillo, J. M., T. Tierney, and R. B. Shaw. 1997. Plant Community Types of Pohakuloa Training Area,

Hawaii. Center for Ecological Management of Military Lands, Colorado State University, Fort Collins, CO. Map.

Herbst, D. R., J. E. Canfield, J. M. Yoshioka, and Z. E. Ellshoff. 1992a. Endangered and threatened wildlife and plants; determination of endangered and threatened status for 15 plants from the island of Maui. Fed. Reg. 57:20772-20878.

Herbst, D. R., J. E. Canfield, J. M. Yoshioka, and Z. E. Ellshoff. 1992b. Endangered and threatened wildlife and plants; determination of endangered and threatened status for 16 plants from the island of Molokai. Fed. Reg. 57:46325-46340.

Herbst, D. R. and J. J. Fay 1979. Endangered and threatened wildlife and plants; determination that three Hawaiian plants are endangered species. Fed. Reg. 44:62468-62469.

Langeheim, V. A. and D. A. Clauge. 1987. The Hawaiian Emperor Volcanic Chain. Part II. Stratigraphic framework of volcanic rocks of the Hawaiian Islands. IN: R. W. Decker, T. L. Wright and P. H. Stauffer (eds.). Vol. I. U. S. Geological Survey Professional Paper 1350.

Loope, L. L. and P. G. Scowcroft. 1985. Vegetation response within exclosures in Hawaii: A review. IN: C. P. Stone and J. M. Scott (eds.). Hawaii's Terrestrial Ecosystems: preservation and management. University of Hawaii Press, Honolulu, HI.

MacDonald, G. A. 1949. Petrography of the Island of Hawaii. U.S. Geological Survey Professional Paper 214D. Map.

Mehrhoff, L. A. 1994. Endangered and threatened wildlife and plants; determination of endangered or threat- ened status for 21 plants from the island of Hawaii, State of Hawaii. Fed. Reg. 59: 10305-10325.

Sato, H. H., W. Ikeda, R. Paeth, R. Smyth and M. Takehiro. 1973. Soil survey of the island of Hawaii. USDA Soil Conservation Service in cooperation with the University of Hawaii.

Shaw, R. B., C. M. Bern, K. A. Schulz, V. E. Diersing, and D. J. Tazik. 1990. U. S. Army Land Condition/Trend Analysis of the Pohakuloa Training Area, Hawaii. Proceedings of the International Symposium on Tropical Hydrology and Caribbean islands Water Resources Congress. American Water Resources Association. San Juan, PR.

Stearns, H. T. and G. A. MacDonald. 1946. Geology and ground-water resources of the island of Hawaii. Hawaii Division of Hydrology Bulletin 7.

U.S. Fish and Wildlife Service. 1997. Species List for the State of Hawaii, May. U.S.D.I. Fish and Wildlife Service, Pacific Islands Ecoregion, Honolulu, Hawaii.

Wagner, W. L., D. R. Herbst and S. H. Sohmer. 1990. Manual of the Flowering Plants of Hawaii. University of Hawaii Press and Bishop Museum Press, Honolulu, Hawaii.

Wolfe, E. W. and J. Morris. 1996. Geologic Map of the Island of Hawaii. U.S. Geologic Survey. Miscellaneous Investigations Series. Map 1-2524-A.

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